A Reference for Recognizing Insect Galleries in Ash Trees in Minnesota

MINNESOTA DEPARTMENT OF AGRICULTURE
FROM THE FARM TO YOUR FAMILY
Plant Protection Division
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Overview:

The purpose of this document is to provide images of different types of damage from pests that may be found in ash trees in Minnesota and to contrast the appearance of these damage types with that caused by emerald ash borer (EAB). All images in this document are of insect damage found in ash trees in Minnesota with the exception of the EAB images which were taken in Ohio and Michigan, as noted. For information on symptoms of EAB on standing trees or comparisons of larval and adult EAB with other insects, see the links below.

Contents:

For more information:

Identification of Emerald Ash Borer and Other Ash Insects:

http://www.emeraldashborer.info/identifyeab.cfm

http://na.fs.fed.us/fhp/eab/pubs/fieldguide/eabfg.pdf

http://www.dnr.wi.gov/Forestry/FH/Ash/eab-id.htm

http://www.forestpests.org/ash/

Emerald Ash Borer Information:

http://www.emeraldashborer.info

http://www.mda.state.mn.us/invasives/eab

Scolytidae:

Unlike other insects found in detection trees, adult bark beetles feed under the bark just as the larvae do. Bark beetles galleries may take the shape of reproductive galleries like figures 3 and 4 or adult feeding galleries like figures 2 and 5.

Ash bark beetles (***Hylesinus*** spp.) were found in 83% of ash trees sampled by Minnesota Department of Agriculture (MDA) during EAB detection tree surveys during 2007.

Figure 1. Bark beetle emergence holes.

Figure 2. Feeding galleries of adult ash bark beetles beginning to show as phloem is removed.

Figure 3. Bark beetle egg-laying galleries cross the grain of the wood.

Figure 4. Larval galleries lie at right angles to egg-laying galleries and are often very closely spaced.

Figure 5. Adult ash bark beetle at knife tip next to gallery.

Agromyzidae:

Ash cambium miner (***Phytobia*** spp.) is a fly (Diptera) present under the bark of ash as a larva. Galleries tend to be at the surface of the sapwood, thin (width of pencil tip) and either straight or a broad zig-zag.

During 2007 MDA detection tree surveys, galleries and/or larvae of ash cambium miner were found in 35% of sampled trees.

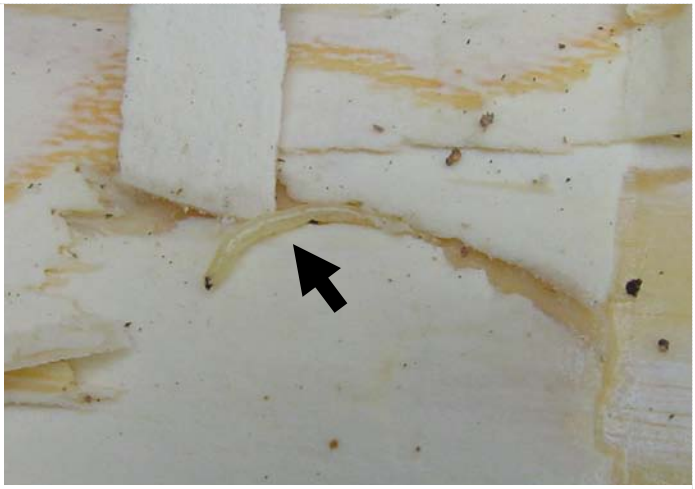

Figure 6. Larva of ash cambimum miner.

Figure 7. Galleries of ash cambium miner.

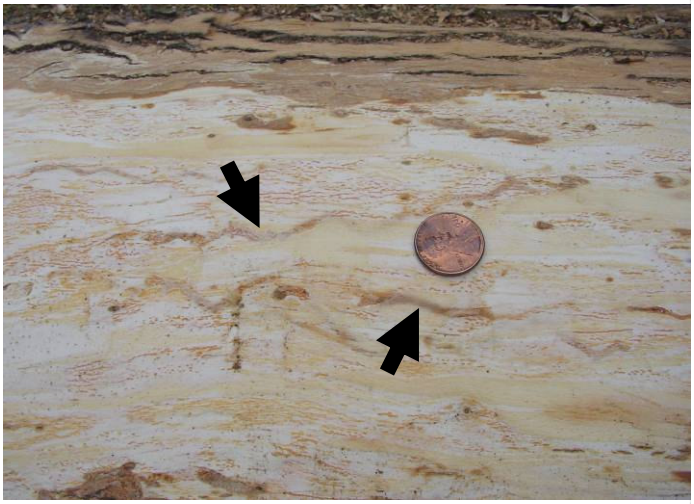

Figure 8. Galleries of ash cambium miner with a penny for reference.

Figure 9. Gallery of ash cambium miner just beginning to show as phloem is scraped away.

Figure 10. Gallery of ash cambium miner already present when tree girdled.

Cerambycidae:

A few species of this beetle family (Coleoptera) may be found under the bark of ash including: banded ash borer (***Neoclytus caprea*** Say), redheaded ash borer (***Neoclytus acuminatus*** Fabricius), and ash and privet borer (***Tylonotus bimaculatus*** Haldeman). Galleries are generally meandering and may be nearly as wide as a pencil. Galleries eventually dive deep into the sapwood.

Galleries and/or larvae of cerambycid species were found in 10% of sampled trees during MDA detection tree surveys in 2007.

Figure 11. Cerambycid larva.

Figure 12. High-density infestation of Cerambycid larvae – there is some similarity in appearance to a older EAB infestation.

Figure 13. Close up of figure 12 showing holes tunneled into wood.

Figure 14. Pupal chamber of a Cerambycid larva deep in wood.

Figure 15. Emergence hole of redheaded ash borer.

Buprestidae:

Two genera of buprestids were found in ash detection trees during 2007. One individual was in the genus ***Dicerca*** and the rest were genus ***Chrysobothris***. Two ***Chrysobothris*** adults were recovered from one tree and identified as ***C.*** sexignata. All buprestids were found almost exclusively in black ash and ~20% of the black ash sampled by MDA during 2007 were infested with ***Chrysobothris***.

Chyrsobothris galleries are not tightly "S"-shaped though they are sometimes sinuous in shape.

Figure 16. ***Chrysobothris*** larva on black ash.

Figure 17. ***Chrysobothris*** larva and gallery in black ash.

Figure 18. ***Chrysobothris*** emergence hole.

Figure 19. Early ***Chrysobothris*** gallery.

Sessiidae:

Galleries and/or larvae of clearwing borers, ***Podesia*** spp. (Lepidoptera: Sessiidae) were found in 7% of sampled trees during MDA detection tree surveys in 2007.

The galleries in Figures 21, 23 and 24 are approximately the width of a felt-tip marker and deeply etched into the sapwood. Clearwing borers tunnel deeply into the wood as larvae and leave large round holes when they emerge as adults. Clearwing borer larvae have legs, distinguishing them from roundheaded and flatheaded borers.

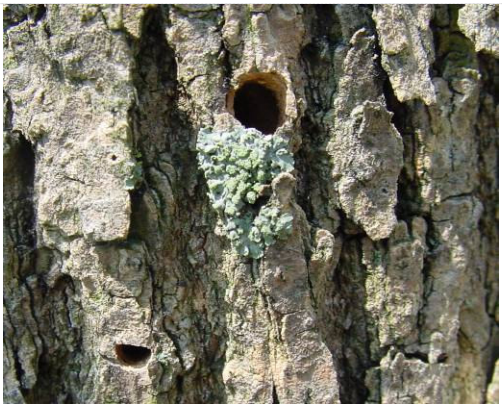

Figure 20. Clearwing moth emergence hole at top and EAB emergence hole at bottom (from Michigan).

Figure 21. Clearwing moth gallery starting at girdle.

Figure 22. Clearwing moth larvae.

Figure 23. Clearwing moth gallery at branch crotch.

Figure 24. Clearwing moth gallery.

Buprestidae:

Emerald ash borer - ***Agrilus planipennis*** Fairmaire

Emerald ash borer larvae tend to make “S”-shaped galleries, particularly during the early stages of colonization. As borers become larger and space becomes more limited, galleries tend to become more meandering.

Figure 25. Early EAB gallery (from Ohio).

Figure 26. EAB galleries in black ash (Michigan).

Figure 27. “D”-shaped emergence holes in de-barked wood (Michigan).

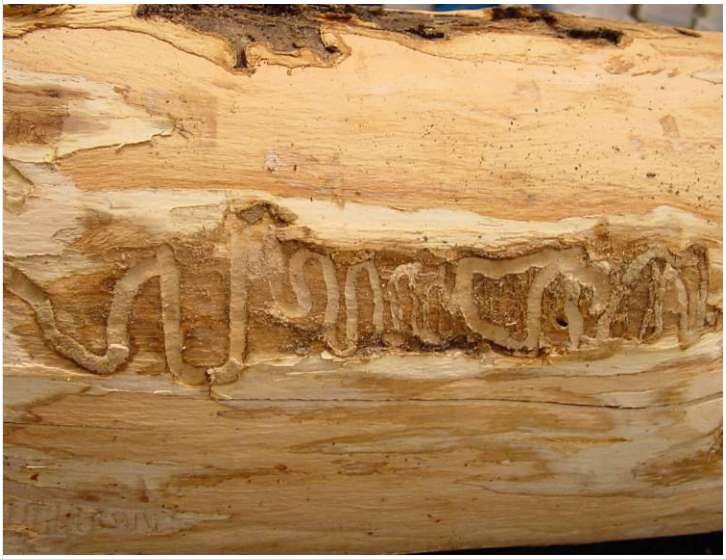

Figure 28. EAB gallery (Michigan).

Figure 29. Old EAB infestation (Ohio).